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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,272	04/08/2004	Tatsuo Suemasu	105-63 DIV/RCE II	8591

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EXAMINER	
BAREFORD, KATHERINE A	
ART UNIT	PAPER NUMBER
1792	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/820,272	SUEMASU ET AL.	
	Examiner	Art Unit	
	Katherine A. Bareford	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 November 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-11,13-18 and 20-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-11,13-18 and 20-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 23, 2009 has been entered.

The amendment filed with the RCE submission of November 23, 2009 has been received and entered. With the entry of the amendment, claims 1-8, 12 and 19 are canceled, and claims 9-11, 13-18 and 20-22 are pending for examination.

Terminal Disclaimer

2. The terminal disclaimer filed on December 12, 2008 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on application number 11/739,575 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 9-11, 13-18 and 20-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent claims 9 and 16 as amended November 23, 2009, now require that the filling of the hole with molten metal be "by relatively reducing pressure in the non-through hole compared with pressure outside the non-through hole" (claim 9) or "by relatively reducing pressure in the through hole compared with pressure outside the through hole" (claim 16). This allows for any method of reducing the pressure and filling the hole. However, the disclosure as filed only provides a specific example of doing such a process (pages 16-18 and 22 of the specification), where the plating solution is provided in a decompression chamber, the pressure inside the chamber is reduced and the substrate is immersed in the plating solution; and then after immersion the chamber is pressurized so that the plating solution flows into the inside of the holes. This is a much narrower method than provided for in the claims, and therefore new matter is present, as the broad scope of the invention as now claimed was not previously taught in the disclosure as filed.

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. The rejection of claims 9 and 13-15 under 35 U.S.C. 103(a) as being unpatentable over Japan 04-206875 (hereinafter '875) in view of Amano (US 5289038) is withdrawn due to applicant's amendments of November 23, 2009 changing the scope of the claims.

8. Claims 9-11 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japan 04-206875 (hereinafter '875) in view of Amano (US 5289038), Schneble, Jr. et al (US 3628999) and Sugitani (US 5657815).

Claims 9-11: '875 teaches that it is well known to provide a metal filling method for semiconductor elements, where a semiconductor substrate such as GaAs is provided and non-through hole is formed with extends from a first surface towards an opposite surface of a substrate. See figure 1(c), pages 1, 5 of translation (hole 4). A metal layer is formed on an inner peripheral surface portion of the non-through hole adjacent to the first surface of the substrate, and on the portion of the first surface of the substrate adjacent to the non-through hole. Figure 1(d), pages 1, 4 of translation (Ti/Au film 6 formed on the hole 4 and around the hole 4). Then the non-through hole is filled with molten metal and the molten metal is allowed to solidify. Figure 1 (e), (f) and page 5 of translation (softened gold 7 would be at least suggested to be molten, because it must be in a condition of being softened by heat as opposed to solidified, and softened would be inclusive of molten). Then part of the substrate is removed such that the solidified metal is exposed through the opposite surface of the substrate. Figure 1(h) and page 5 of translation.

Claim 13: part of the substrate is removed by polishing. Page 1 of translation ("processed by polishing").

Claim 14: the solidified metal comprises an external section which protrudes from the first surface of the substrate. Figure 1(g).

Claim 15: the external section comprises a bump. Figure 1(g).

'875 provides all the features of these claims except that (1) before forming the inner layer an oxide layer is formed on an inner peripheral surface portion of the non-through hole adjacent to the first surface of the substrate and on a portion of the first surface of the substrate adjacent to the non-through hole, such that only the oxide layer is layered on the substrate, (2) filling the hole with molten metal by relatively reducing pressure in the hole compared to pressure outside the hole, (3) filling the hole with molten metal by immersing the substrate in molten metal (claim 10), and (4) then solidifying the metal by discharging the substrate from the molten metal (claim 11).

However, Amano teaches that when providing semiconductor substrates with non-through holes to which metal filling is provided, it is well known to provide a first layer of oxide (insulation film 22 of silica) directly on the substrate in the hole (concave) are and on a portion of the substrate adjacent this area. Figure 2 and column 4, line 40 through column 5, lines 35. Then a metal film 23 is provided directly on the insulation film 22 in the hole (concave) area and a portion of film 22 adjacent the hole area. Column 5, lines 25-35 and figure 2. Then, over that area the metal filling area 26 is provided. Column 5, lines 5-15.

Schneble teaches a metal filling method. Column 4, lines 40-75. A hole is formed in a work piece extending from a first surface towards and opposite surface of a work

piece. Column 4, lines 55-60 (holes 28) and figure 1E. The hole extends "into" base 10, and is not required to pass entirely through the substrate (base). Column 4, lines 55-50 and Figure 1. Then a metal layer is formed on at least an inner surface of one end of the hole adjacent the first surface of the work piece. Column 4, lines 55-65 (deposit 30) and figure 1F. The metal layer is also formed on a portion of the first surface of the work piece adjacent the hole, and thus is directly adhered to the first surface of the work piece adjacent the hole. Column 4, lines 60-70, column 5, lines 5-15 and figure 1F (land 32 on the top of mask layer 26 of the work piece, note that the hole is formed in a "work piece" that has base 10 and layers 22, 24, 26 as shown in figure 1E, and thus the top of mask layer 26 is the "first surface" of the work piece; to which the metal layer is directly adhered to (stuck fast or attached) until the layer 26 is actually removed as in figure 1G, column 4, lines 65-70). Then a third step of filling a molten metal into the fine hole is provided. Column 4, lines 65-75, column 5, lines 25-30 (solder would be metal) and Figure 1H (see 34). These form conductive passageways (connectors). Column 2, lines 40-50. The hole is filled by immersing the work piece in molten metal. Column 2, lines 1-10, column 4, lines 65-75, column 5, lines 20-60 (dipping in a molten solder bath). The solder metal comprises an external section which protrudes from the first surface of the work piece, forming a "bump" shape. Figure 1H and column 4, lines 70-75.

Sugitani teaches that a way of impregnating shaped porous material of particles with molten metal is to provide the shaped porous material in a passage mold, pass the material into a molten metal filled cavity so that the shaped material is immersed into

molten metal, and providing pressure to the molten metal so that it is injected under pressure to cause the molten metal to penetrate the aggregation of the particles through the interstices between the particles, and then pass the impregnated material out of the cavity to cool and solidify. See figures 7-8, column 7, line 55 through column 8, line 33, column 9, line 65 through column 10, line 6, and column 14, line 25 through column 15, line 50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify '875 to provide an oxide insulation film in the non-through hole and adjacent the non-through hole, directly on the substrate and under the area where the metal layer is provided as suggested by Amano with an expectation of providing a desirable insulation between the semiconductor substrate and the metal layer as '875 teaches providing a metal layer between a semiconductor substrate and filled metal of a hole area and Amano teaches that when providing a metal layer between a semiconductor substrate and filled metal of a hole area it is well known to further provide an oxide insulation layer between the semiconductor substrate and the metal layer. It would further have been obvious to modify '875 in view of Amano to provide the metal filling method by immersing the work piece in molten metal as suggested by Schneble with an expectation of desirable metal filling results, because '875 in view of Amano provides filling metal in a non-through hole after the hole area has an oxide layer followed by a metal layer; and Schneble provides a known way to fill a non-through hole with a metal layer on the inside with a metal fill. It would further

have been obvious to modify '875 in view of Amano and Schneble to further remove the work piece from the molten metal bath and solidify the molten metal, in order to have a desirable treated substrate for use, because '875 in view of Amano and Schneble teaches to dip the article in molten metal, and demonstrates the result of a plated and filled article, indicating that the article must be removed from the molten metal bath for final use and furthermore the molten metal would solidify after removed from the bath, because it was no longer heated. Moreover, it would further have been obvious to modify '875 in view of Amano and Schneble provide pressure on the molten metal in a vessel so that pressure inside the non-through holes in the immersed substrate is relatively lower than the pressure outside the non-through holes as suggested by Sugitani in order to provide desirable impregnation of the holes, because '875 in view of Amano and Schneble provides impregnation of molten metal into the holes by immersion, and Sugitani teaches that when impregnating a molten metal in a porous material (the holes of '875 would be pores as well), it is known to provide the porous material into an immersion vessel and provide pressure on the molten metal so it is injected into the pores of the porous material, indicating that the pressure inside the pores is relatively reduced compared to the pressure of the metal outside the pores, since the metal is pushed into the pores, allowing efficient filling of pores.

9. Claims 16-18 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over '875 in view of Amano, Schneble and Sugitani as applied to claims 9-11 and 13-15 above, and further in view of Locke et al (US 5245751).

'875 in view of Amano, Schneble and Sugitani teaches all the features of these claims except (1) that the hole is a through hole that extends through the work piece (claim 16) and that the metal filling method further comprises closing the opening of the through holes and then opening the closed opening (claim 16), (2) and the closing of the opening using sealing material (claim 20).

Locke teaches that it is well known to provide connector through holes in an article where the holes are to be filled with metal. Column 4, lines 5-20. Locke teaches that it is known to form the connectors by providing a via or hole 82 that extends partially into a substrate (layer 80) of a work piece. Figure 6a and column 8, lines 20-30. Then the hole is plated to fill with conductor metals. Figure 6b and column 8, lines 25-35. Then the substrate 80 is partially removed to expose the metal in the hole by a process such as etching. Figure 6c and column 8, lines 35-40. Solder can be plated into the holes. Column 8, lines 40-45. Locke also teaches that it is known to form the connectors by providing a through hole 58 through a substrate (sheet 56) and to close/block/seal the hole using a layer 54 (copper foil). Figure 5a and column 7, lines 40-47. Then the hole is plated to fill with conductor metals. Column 7, lines 45-55 and figure 5b. Then the layer 54 is removed to expose the metal through the opening of the through hole. Figure 5c and column 7, lines 54-60.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify '875 in view of Amano, Schneble and Sugitani to provide a through hole that extends through the entire work piece but is blocked by a sealing layer (closing one side of the opening) to allow desirable filling and then to open the closed opening by removing the sealing layer as suggested by Locke in order to provide desirable connectors, because '875 in view of Amano, Schneble and Sugitani teaches to provide holes into the substrate to be filled with metal and that the holes will become through holes and Locke teaches that when providing connector holes, it is known to provide them as a through hole that extends through the entire work piece but is blocked by a sealing layer (closing one side of the opening) to allow desirable filling, and then to open the closed opening by removing the sealing layer, which would provided an equivalent through hole system result to that provided by '875 in view of Amano, Schneble and Sugitani. It would have been obvious to that the sealing layer would be provided either before or after hole formation with an expectation of equivalent results as long as it was provided before the filling of the holes, because the purpose of the sealing layer is to block the opening during filling. Also note In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results) (MPEP 2144.04. IV. C).

10. Claims 9-11 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japan 04-206875 (hereinafter '875) in view of Amano (US 5289038), Schneble, Jr. et al (US 3628999) and Japan 2002-158191 (hereinafter '191).

Claims 9-11: '875 teaches that it is well known to provide a metal filling method for semiconductor elements, where a semiconductor substrate such as GaAs is provided and non-through hole is formed with extends from a first surface towards an opposite surface of a substrate. See figure 1(c), pages 1, 5 of translation (hole 4). A metal layer is formed on an inner peripheral surface portion of the non-through hole adjacent to the first surface of the substrate, and on the portion of the first surface of the substrate adjacent to the non-through hole. Figure 1(d), pages 1, 4 of translation (Ti/Au film 6 formed on the hole 4 and around the hole 4). Then the non-through hole is filled with molten metal and the molten metal is allowed to solidify. Figure 1 (e), (f) and page 5 of translation (softened gold 7 would be at least suggested to be molten, because it must be in a condition of being softened by heat as opposed to solidified, and softened would be inclusive of molten). Then part of the substrate is removed such that the solidified metal is exposed through the opposite surface of the substrate. Figure 1(h) and page 5 of translation.

Claim 13: part of the substrate is removed by polishing. Page 1 of translation ("processed by polishing").

Claim 14: the solidified metal comprises an external section which protrudes from the first surface of the substrate. Figure 1(g).

Claim 15: the external section comprises a bump. Figure 1(g).

'875 provides all the features of these claims except that (1) before forming the inner layer an oxide layer is formed on an inner peripheral surface portion of the non-through hole adjacent to the first surface of the substrate and on a portion of the first surface of the substrate adjacent to the non-through hole, such that only the oxide layer is layered on the substrate, (2) filling the hole with molten metal by relatively reducing pressure in the hole compared to pressure outside the hole, (3) filling the hole with molten metal by immersing the substrate in molten metal (claim 10), and (4) then solidifying the metal by discharging the substrate from the molten metal (claim 11).

However, Amano teaches that when providing semiconductor substrates with non-through holes to which metal filling is provided, it is well known to provide a first layer of oxide (insulation film 22 of silica) directly on the substrate in the hole (concave) are and on a portion of the substrate adjacent this area. Figure 2 and column 4, line 40 through column 5, lines 35. Then a metal film 23 is provided directly on the insulation film 22 in the hole (concave) area and a portion of film 22 adjacent the hole area. Column 5, lines 25-35 and figure 2. Then, over that area the metal filling area 26 is provided. Column 5, lines 5-15.

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and Figure 1. Then a metal layer is formed on at least an inner surface of one end of the hole adjacent the first surface of the work piece. Column 4, lines 55-65 (deposit 30) and figure 1F. The metal layer is also formed on a portion of the first surface of the work piece adjacent the hole, and thus is directly adhered to the first surface of the work piece adjacent the hole. Column 4, lines 60-70, column 5, lines 5-15 and figure 1F (land 32 on the top of mask layer 26 of the work piece, note that the hole is formed in a "work piece" that has base 10 and layers 22, 24, 26 as shown in figure 1E, and thus the top of mask layer 26 is the "first surface" of the work piece; to which the metal layer is directly adhered to (stuck fast or attached) until the layer 26 is actually removed as in figure 1G, column 4, lines 65-70). Then a third step of filling a molten metal into the fine hole is provided. Column 4, lines 65-75, column 5, lines 25-30 (solder would be metal) and Figure 1H (see 34). These form conductive passageways (connectors). Column 2, lines 40-50. The hole is filled by immersing the work piece in molten metal. Column 2, lines 1-10, column 4, lines 65-75, column 5, lines 20-60 (dipping in a molten solder bath). The solder metal comprises an external section which protrudes from the first surface of the work piece, forming a "bump" shape. Figure 1H and column 4, lines 70-75.

'191 teaches that a known way of filling in metal in fine pores (non through holes) in substrates is to provide a molten metal tank in a vacuum chamber, reduce the pressure in the chamber, immerse the substrate in the molten metal tank, and then pressurizing the chamber to fill the molten metal into the pores without generating an air gap in the pores. Abstract, figures 3-4, and paragraphs [0012]--[0013]. This will

provide relatively reducing pressure in the hole compared to a pressure outside the hole. After filling the substrate is removed and the molten metal allowed to cool, which would solidify the metal. Paragraph [0014].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify '875 to provide an oxide insulation film in the non-through hole and adjacent the non-through hole, directly on the substrate and under the area where the metal layer is provided as suggested by Amano with an expectation of providing a desirable insulation between the semiconductor substrate and the metal layer as '875 teaches providing a metal layer between a semiconductor substrate and filled metal of a hole area and Amano teaches that when providing a metal layer between a semiconductor substrate and filled metal of a hole area it is well known to further provide an oxide insulation layer between the semiconductor substrate and the metal layer. It would further have been obvious to modify '875 in view of Amano to provide the metal filling method by immersing the work piece in molten metal as suggested by Schneble with an expectation of desirable metal filling results, because '875 in view of Amano provides filling metal in a non-through hole after the hole area has an oxide layer followed by a metal layer; and Schneble provides a known way to fill a non-through hole with a metal layer on the inside with a metal fill. It would further have been obvious to modify '875 in view of Amano and Schneble to further remove the work piece from the molten metal bath and solidify the molten metal, in order to have a desirable treated substrate for use, because '875 in view of Amano and Schneble

teaches to dip the article in molten metal, and demonstrates the result of a plated and filled article, indicating that the article must be removed from the molten metal bath for final use and furthermore the molten metal would solidify after removed from the bath, because it was no longer heated. Moreover, it would further have been obvious to modify '875 in view of Amano and Schneble provide pressure on the molten metal in a vessel so that pressure inside the non-through holes in the immersed substrate is relatively lower than the pressure outside the non-through holes as suggested by '191 in order to provide desirable impregnation of the holes, because '875 in view of Amano and Schneble provides impregnation of molten metal into the holes by immersion, and '191 teaches that when impregnating a molten metal into a substrate with pores (holes), it is known to provide the substrate in an immersion vessel in a low pressure environment, and then provide pressure on the molten metal so that it fills the holes without leaving air gaps, indicating that the pressure inside the holes is relatively reduced compared to the pressure of the metal outside the pores, since the metal is pushed into the holes, allowing efficient filling of pores.

11. Claims 16-18 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over '875 in view of Amano, Schneble and '191 as applied to claims 9-11 and 13-15 above, and further in view of Locke et al (US 5245751).

'875 in view of Amano, Schneble and '191 teaches all the features of these claims except (1) that the hole is a through hole that extends through the work piece (claim 16)

and that the metal filling method further comprises closing the opening of the through holes and then opening the closed opening (claim 16), (2) and the closing of the opening using sealing material (claim 20).

Locke teaches that it is well known to provide connector through holes in an article where the holes are to be filled with metal. Column 4, lines 5-20. Locke teaches that it is known to form the connectors by providing a via or hole 82 that extends partially into a substrate (layer 80) of a work piece. Figure 6a and column 8, lines 20-30. Then the hole is plated to fill with conductor metals. Figure 6b and column 8, lines 25-35. Then the substrate 80 is partially removed to expose the metal in the hole by a process such as etching. Figure 6c and column 8, lines 35-40. Solder can be plated into the holes. Column 8, lines 40-45. Locke also teaches that it is known to form the connectors by providing a through hole 58 through a substrate (sheet 56) and to close/block/seal the hole using a layer 54 (copper foil). Figure 5a and column 7, lines 40-47. Then the hole is plated to fill with conductor metals. Column 7, lines 45-55 and figure 5b. Then the layer 54 is removed to expose the metal through the opening of the through hole. Figure 5c and column 7, lines 54-60.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify '875 in view of Amano, Schneble and '191 to provide a through hole that extends through the entire work piece but is blocked by a sealing layer (closing one side of the opening) to allow desirable filling and then to open the closed opening by removing the sealing layer as suggested by Locke in order to provide

desirable connectors, because '875 in view of Amano, Schneble and '191 teaches to provide holes into the substrate to be filled with metal and that the holes will become through holes and Locke teaches that when providing connector holes, it is known to provide them as a through hole that extends through the entire work piece but is blocked by a sealing layer (closing one side of the opening) to allow desirable filling, and then to open the closed opening by removing the sealing layer, which would provided an equivalent through hole system result to that provided by '875 in view of Amano, Schneble and '191. It would have been obvious to that the sealing layer would be provided either before or after hole formation with an expectation of equivalent results as long as it was provided before the filling of the holes, because the purpose of the sealing layer is to block the opening during filling. Also note In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results) (MPEP 2144.04. IV. C).

12. Applicant cannot rely upon the foreign priority papers to overcome the rejections using Japan 2002-158191 because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

13. The Examiner notes the provision of Japan 2002-158191 with the IDS of January 15, 2009.

Response to Arguments

14. Applicant's arguments with respect to claims 9-11, 13-18 and 20-22 have been considered but are moot in view of the new ground(s) of rejection.

The new use of references to Sugitani and Japan 2002-158191 are used as discussed in the rejections above as to the newly claimed features.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/
Primary Examiner, Art Unit 1792